

ON THE ANATOMY OF SOME TASMANIAN SNAILS.

BY C. HEDLEY, F.L.S., CORR. MEM.

(Plates II. and III.)

The material for this paper was chiefly collected by myself during a short holiday excursion to the Island of Tasmania. To Mr. W. F. Petterd, of Launceston, the well-known conchologist, and to Mr. W. R. Dyer, of Scottsdale, I am under great obligations; without the kind assistance of these gentlemen my scientific booty would have been but small.

As far as the shells are concerned, the molluscan fauna of Tasmania has been closely studied, but information regarding structural details of the animals is much needed. For until we have acquired this knowledge, no classification worthy of the name can be constructed. Full particulars of the shells whose soft parts I am about to describe will be found in the Monographs of Dr. Cox, Messrs. Legrand and Petterd, and further notices in the writings of Reeve, Semper, Quoy and Gaimard, Tenison-Woods, Tryon, Pilsbry, &c. It will therefore be unnecessary for me to add bibliographical references in dealing with these well-known species.

BULIMUS DUFRESNI, Leach.

This handsome shell has attracted the notice of every scientific visitor to the island. The figure of the animal in the "Voyage of the Astrolabe," Vol. II, pl. x., fig. 1, is unsatisfactory, showing as it does a well-marked pedal groove where none exists. I have therefore re-figured it in the accompanying plate. From a specimen of the small variety common round Hobart I drew up

the following description :—Animal 35 mm. in total length and, measured a little posterior to the tentacles, 6 mm. in breadth, and the same in height ; colour slate, sometimes with a yellowish tinge on the body, darkening into black on the tentacles, greyish-yellow on the sole of the foot and on the mantle-collar ; the muzzle and anterior dorsal area (in short, that space enclosed by the two conspicuous furrows which run back from the lips to the mantle, which I will call the *facial area*) are ornamented by long narrow tubercles, arranged in about a dozen longitudinal rows, the sides and tail are divided into irregular polygonal spaces, which are partially subdivided and finely granulated ; the tail tapers slightly, is rounded posteriorly, and never keeled ; the tentacles are 10 mm. long, tapering gradually, finely granulated, the bases 3 mm. apart, the terminal bulb is asymmetrical, being only developed on the under side ; the genital orifice appears just beneath the groove bounding the facial area, 5 mm. behind the right oculiferous tentacle. Habits bold and active ; the tail is the first portion to emerge from the mantle and the last to disappear within it ; when the animal is in motion the axis of the shell is oblique to that of the body, the initial whorl being carried on the right side of the tail, which projects 2 or 3 mm. beyond it, the penultimate whorl resting on a wide, smooth, saddle-like space. It haunts the under side of logs, stones, fallen tree-ferns, &c., and ranges over the whole island. Another animal, from the Ringarooma district, measured, total length 46 mm., height 12 mm., length of tentacles 15 mm. The egg has been described and figured by Tenison-Woods (P.L.S.N.S.W., Vol. III., p. 91, pl. vii., fig. 1a.). Specimens of the egg of this species, which I received from Mr. Petterd, do not quite accord with the observation quoted ; they are regularly oval, not so rounded as the figure, pure white, shining, minutely granular, the granulations viewed through a lens recalling those on an emu's egg ; major axis, 11 mm. ; minor axis, 8 mm. Mr. Dyer tells me that they are

deposited in the ground under a log during October and November. The radula and genitalia have been figured by Semper, who incorrectly locates the species in the Sandwich Islands (Reis. im Philip. Vol. III., p. 123, pl. xii., figs. 23, 24, 25, and pl. xvi., fig. 7). The jaw I find to be boomerang-shaped, smooth, arcuate, ends rounded, with no median projection.

BULIMUS TASMANICUS, Pfeiffer.

This species is arboreal in its habits, and confined to a narrow belt of coast country. I was unable to visit its haunts and view the creature alive. Mr. Petterd kindly presented me with some alcohol specimens, from Maria Island, for dissection. He informs me that the animal is greenish-grey in colour, with flat, thin, pointed tail. This species, as might be inferred from the resemblance of the shells, closely approaches *B. mastersi*, Cox, (P.R.S.Q., Vol. VI., p. 250, pl. xiv.) in its dentition. The jaw is thin, membranous, semitransparent, light horn-colour, crossed obliquely on each side by about sixteen delicate folded ribs denticulating both margins; these ribs run obliquely towards the median line of the jaw, and, meeting in the centre, form a median triangular space. The radula is composed of 130 rows of 84-5-1-5-84; of these the rachidian presents a single, ovate, lanceolate cusp, whose extremity reaches the margin of the basal plate; this is flanked by five laterals having the distal posterior angle of the basal plate briefly alate and a small cusp developed upon the outer base of the main cusp, whose stout ovate blade just projects over the base of attachment; seven rows from the centre the marginal type appears, the main cusp becoming bicuspidate; on approaching the edge of the ribbon the teeth grow smaller, and assume that slender, sinuous aspect so characteristic of extreme marginals. The distinguishing features of the genitalia are:—penis-sac long and slender, produced into an extremely long flagellum, which is coiled up at the tip, and apparently without a

retractor muscle ; prostate and vagina spirally twisted, the former connected by a short but much convoluted hermaphrodite duct with the ovotestis, a compact bilobed body.

ANOGLYPTA LAUNCESTONENSIS, Reeve.

This species is confined to a mountainous district in the N.E. of the island. I collected it among the fern-tree gullies on Mr. Dyer's estate, where it was plentiful. The animal was not very different in form from *B. dufresni*, and measured (total length) 47 mm. ; tentacles 10 mm. ; colour dark chestnut shaded to chocolate on the back, tentacles shaded to black on the tips. Habits very shy and timid, crawling very slowly ; it frequents damp places under logs and decaying stems of tree-ferns. The fire and axe of civilisation threaten to diminish the already narrow range of this splendid and interesting species ; but its haunts are so rugged and remote that I do not fear its extinction. Mr. Dyer says that an egg resembling, though different from, that of *B. dufresni* is laid by this mollusc at similar seasons and in similar localities. The jaw is rather straight and broad, irregularly slightly dentate on the cutting margin, smooth on the convex margin, closely and finely transversely striate. The teeth are arranged in 160 rows of 40-6-1-6-40 ; the rachidian cusp is single, straight, slender, smaller than the laterals, the cutting point reaching four-fifths of the length of the widely expanded basal plate ; the laterals possess a single stout cusp with a rounded cutting point overlapping the posterior margin of the basal plate, whose distal margin is alate ; from these the marginals differ in the longer more inclined cusp, the extreme marginals having their cusps low and irregularly notched. The genitalia are characterised by a long, flattened, twisted penis-sac, retractor muscle inserted near apex, and the spermatheca on a long slender duct.

RHYTIDA LAMPRA, Pfeiffer.

This carnivorous mollusc is generally distributed throughout Tasmania. Mr. Petterd relates its cannibal propensities as similar to those of its Queensland relative (P.R.S.Q., Vol. v., p. 152). The specimen I examined measured, when expanded, 40 mm. from head to tail; but I am informed that the species in other localities attains larger dimensions. Colour, orange-brown on the edge of the foot, passing through chestnut-brown to black upon the head and tentacles, mantle-collar orange-brown. Down the centre of the back runs a small groove from the shell to between the tentacles, and on either side of this the facial area is ornamented by three longitudinal rows of small round tubercles; tail and sides divided into irregular polygonal spaces which are partially sub-divided and finely granulated. The tail is extremely short, hardly passing the shell, while the anterior portion of the body, as in other *Agnatha*, is capable of a leech-like extension, a provision for enabling the creature to stretch itself into the remoter whorls of a shell whose inhabitant it may be engaged in devouring. Habits bold and active; crawls more rapidly than the *Helicidae* usually do. The radula is constructed of 75 rows of 40-0-40, is strap-shaped, measuring 15 mm. in length and 4 in breadth, each half-row curving from the margin and meeting its fellow at an acute angle in the centre of the ribbon; the rachidian (as is usual in the genus) has been lost, the two innermost laterals are usually rudimentary, but the third attains its full development, having a basal plate the shape of the sole of a man's foot and a straight slender cusp in the same plane, the whole tooth resembling a clasp knife with the blade open; the teeth continue of the same size to the margin, the pattern differing slightly by the basal plate of the remotest becoming triangular. In the genitalia the penis-sac is slender; a sessile globose spermatheca is inserted upon a short pyriform vagina.

HELICARION VERREAUXI, Pfeiffer.

This is the southernmost member of its genus, the "enfant perdu" of its race. The other species that have been associated with it, *fumosa*, Tenison-Woods, and *milligani*, Pfeiffer, may be referred to *Paryphanta* until their position be authoritatively decided by scalpel and microscope. Like *B. dufresni* and *R. lampra*, this species ranges over the entire island, hiding in dry weather under logs and stones. The animal measures 37 mm. in total length, resembles in form the continental species, *H. robustus*, Gould, and *H. hyalinus*, Pfr., but differs in colour, the entire body being coal black with the exception of the tail, whose extremity is lemon-yellow. The jaw is arcuate, with central projection, smooth, ends rounded. The radula consists of 130 rows of 70-17-1-17-70; the rachidian is broadly reflected and overlaps the basal plate laterally for more than half its length, then is divided into a slender lanceolate median cusp exceeding in length the basal plate and two small accessory cusps with well developed cutting edges; the laterals have the outer posterior margin of the basal plate very short and square, the main cusp is slightly larger than that of the rachidian and bears at its outer base a well developed accessory cusp, which increases as the teeth retreat; the marginals possess slender inclined knife-like cusps which become bifid as the border of the ribbon is approached. As regards the genitalia, the penis-sac is long and slender, twisted into a figure of eight, and terminating in a round knob, retractor muscle inserted on the distal curve of the 8; vas deferens con-torted on its departure from the prostate; spermatheca large, slightly dilated, acuminate above, connected with the genital system by a short wide duct.

CYSTOPELTA PETTERDI, Tate.

A figure and description of this mollusc will be found in the preceding volume of these Proceedings (Pl. i., p. 44). I took the

opportunity of comparing Tasmanian specimens with those collected by Mr. Helms on Mt. Kosciusko, also with some taken by Mr. Musson at Ballarat, and I find no differences of specific importance between them. In Tasmania I gathered the species under the guidance of the gentleman whose name it bears, from the original locality, Cataract Hill, near Launceston. I also found it at Dennison Gorge and on Mr. Dyer's estate, Scottsdale. In the first locality the animals lived under logs, upon a dry, scantily-timbered hillside; in the two latter places they inhabited damp fern-tree gullies. As the consequence, probably, of more favourable surroundings, those from the moist situations were larger in size and lighter in colour than the type variety. Mr. Petterd pointed out that its habits were gregarious. A dozen likely pieces of fallen timber might be searched without result, yet the next might conceal a score of these slugs. The larger form was pale greenish-yellow spotted with black; the black spots on the shield are most irregular in size and distribution. The figure I published from a spirit specimen gives no idea of the animal in life, therefore I append a second sketch taken from a living individual on the spot.

EXPLANATION OF PLATES.

PLATE II.

R., Rachidian tooth; o.t., ovotestis; h.d., hermaphrodite duct; ov., oviduct; c.o., common orifice; sp., spermatheca; p., penis-sac; r.m.p., retractor muscle of penis.

- Fig. 1. Jaw of *Bulimus dufresni*. Magnified.
- Fig. 2. Jaw of *Bulimus tasmanicus*. Magnified.
- Fig. 3. Central portion of radula of ditto. Magnified.
- Fig. 4. Genital system of ditto.
- Fig. 5. Jaw of *Anoglypta launcestonensis*. Magnified.

PLATE II. (*continued*).

- Fig. 6. Central portion of radula of ditto. Magnified.
Fig. 7. Genital system of ditto.
Fig. 8. Radula of *Rhytida lampra*. Magnified.
Fig. 9. Genital system of ditto.
Fig. 10. Jaw of *Helicarion verreauxi*. Magnified.
Fig. 11. Central portion of radula of ditto. Magnified.
Fig. 12. Genital system of ditto.

PLATE III.

- Fig. 1. Animal of *B. dufresni*.
Fig. 2. Animal of *A. launcestonensis*.
Fig. 3. Animal of *R. lampra*.
Fig. 4. Animal of *H. verreauxi*.
Fig. 5. Animal of *C. petterdi*.